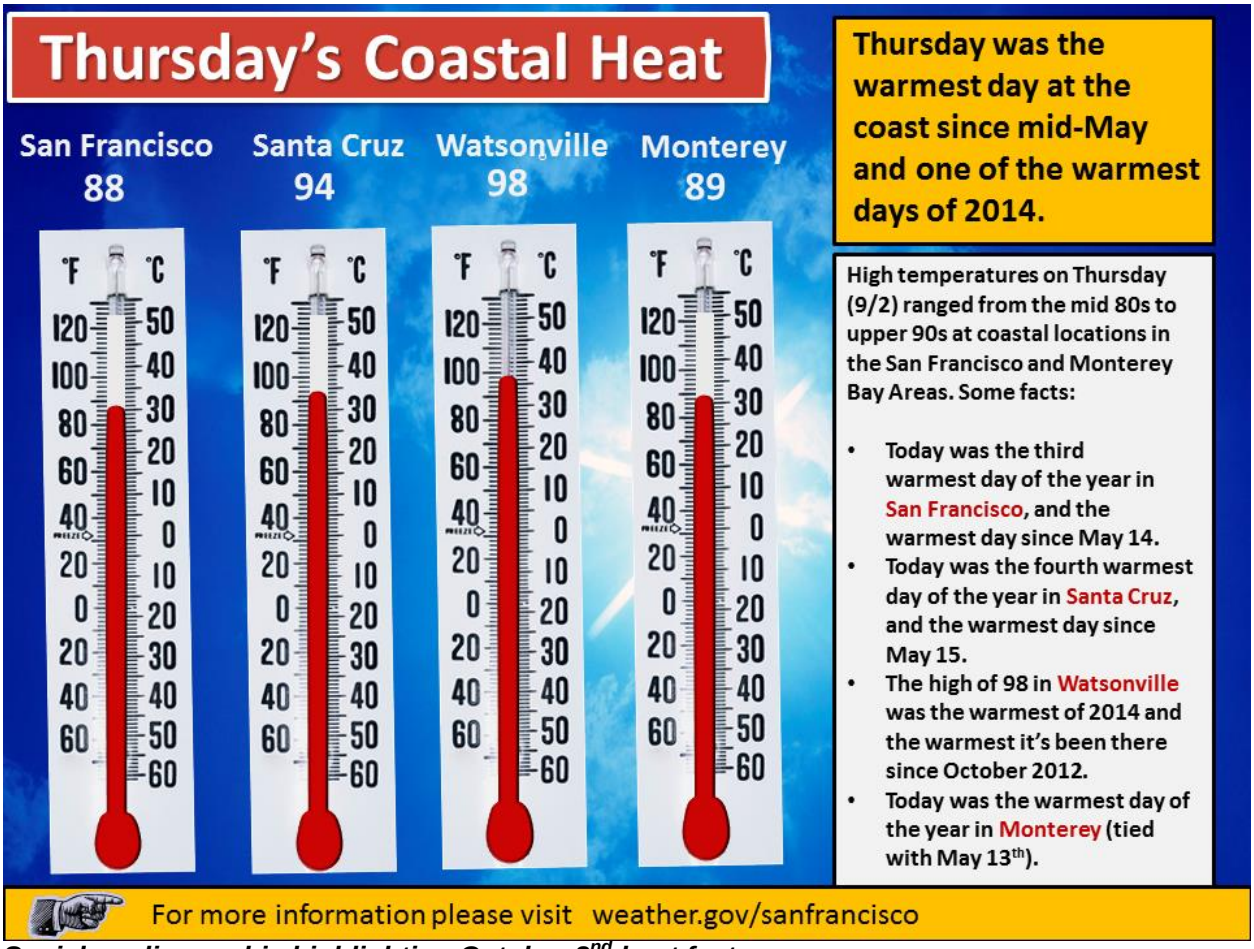
October 2014 Regional Climate Summary

For the San Francisco Bay Area and Monterey Bay Area

October 2014 was a warm month. Average October temperatures were the warmest on record at several climate stations. Precipitation totals for October were below normal across the San Francisco Bay Area. However, October was a wetter than normal month at locations near Monterey Bay.

<u>October Temperatures and Fog</u>:

The month began with brisk offshore winds in the North and East Bay Hills. These offshore winds set the stage for an abrupt warm-up on October 2, especially in coastal areas. The typical high temperature distribution of warmer conditions inland and cooler conditions near the coast was reversed on October 2nd. Many coastal locations were warmer than inland areas. For example, the high of 94 degrees F in Santa Cruz was 4 degrees warmer than Livermore's high of 90. Also, Downtown San Francisco (88 degree high temperature) and Monterey (89) were both slightly warmer than Concord (87). October 2nd was the warmest day at the coast since mid-May and one of the warmest days of 2014. Watsonville Airport reported a high of 98 on October 2nd, the warmest temperature reading there since October 2012.



Social media graphic highlighting October 2nd heat facts

The warmth of October 2 did not set any daily records. However, very warm conditions persisted across the region for three additional days and resulted in eight daily high temperature records from October 5-8.

Some San Francisco climate facts from the early October heat event:

- The overnight low in Downtown San Francisco on October 3 was 65 degrees. The last time the City had a low temperature that warm was more than four years ago, on August 24, 2010.
- During five consecutive days (from October 1-5) Downtown San Francisco's high temperature was 82 degrees or warmer. The last time a heat event of similar magnitude and duration occurred in San Francisco was in September of 2008 – more than 6 years ago.

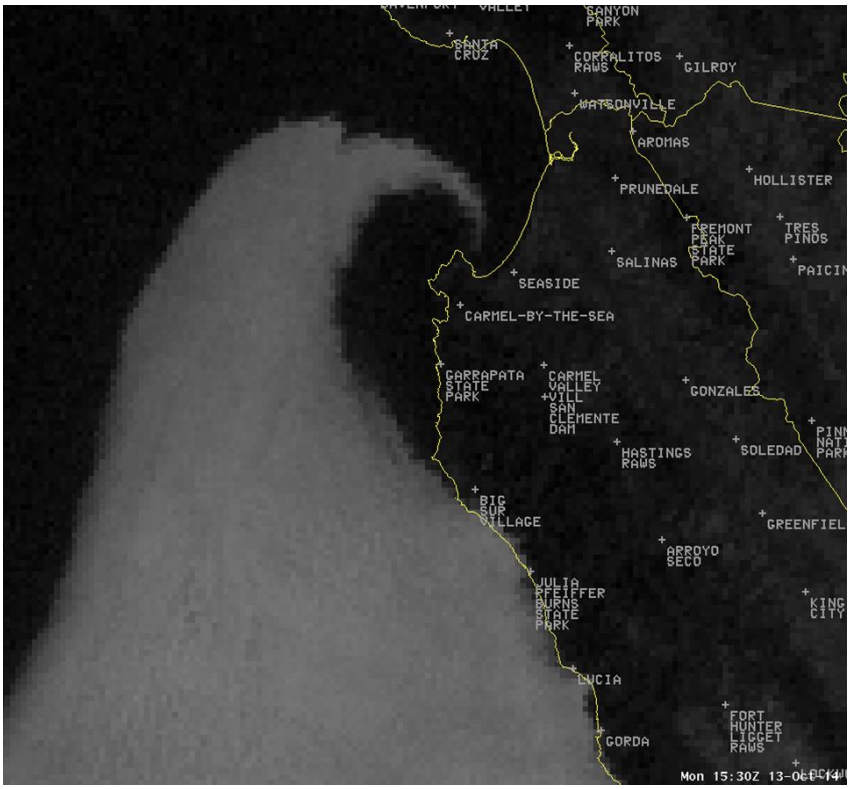
Once offshore flow ended and the associated heat event began to wane, dense fog developed near the coast, and also locally in the valleys during the late night and early morning hours. Patchy dense fog was observed during the morning hours of October 6, 7 and 9.

Image taken from the "Sutro Tower Cam" on the morning of Monday, October 6, showing a shallow fog layer advancing through the Golden Gate.

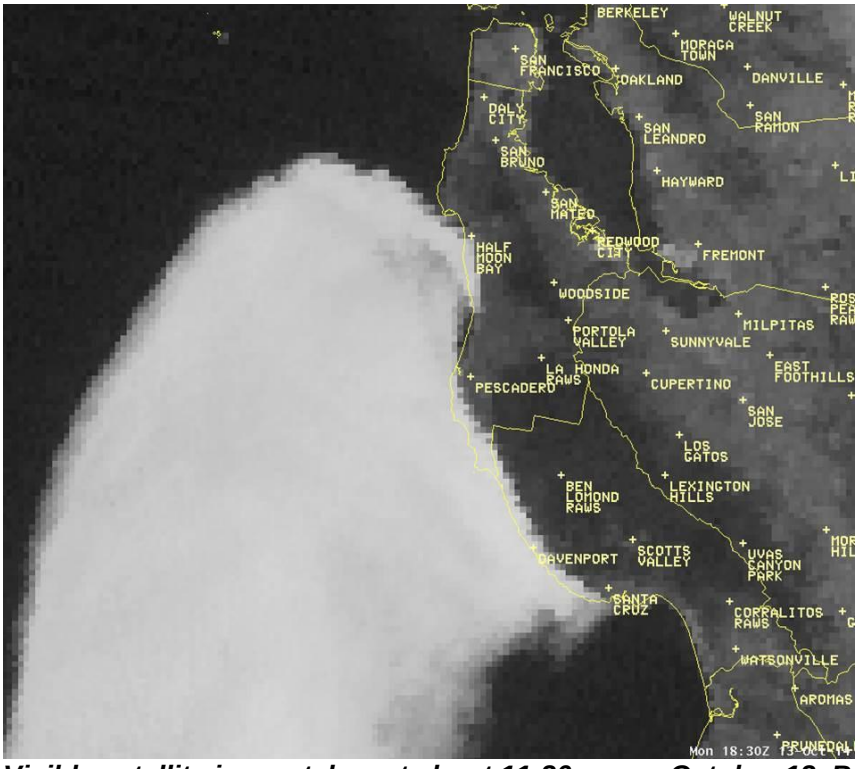
Image of fog rolling over the East Bay Hills on Thursday October 9. Image credit: Alan Wang, ABC 7

Offshore flow returned to the region on Saturday, October 11, prompting Red Flag Warnings for the North and East Bay Hills as well as the Santa Cruz Mountains. Dry offshore winds persisted into the morning hours of Monday, October 13. This offshore wind event resulted in three more daily record high temperatures on Sunday, October 12.

As sometimes occurs at the conclusion of an offshore wind event, a “southerly surge” developed on the morning of October 13. Fog advanced from south to north up the coast, reaching Monterey Bay by mid-morning and then Half Moon Bay by late morning.



Visible satellite image of the Monterey County Coast showing a fog bank advancing northward, with the leading edge of the fog wrapping around the Monterey Peninsula. This image was taken at about 8:30 am on the morning of Monday, October 13



Visible satellite image taken at about 11:30 am on October 13. By this time, the leading edge of the fog bank had reached Half Moon Bay.

Temperatures were much above normal during the first half of October, but then dropped back closer to normal during the second half of the month when the weather pattern transitioned and became more unsettled with periodic rain events. Patchy dense fog developed on a few more occasions during the second half of the month, including a dense fog event at San Jose airport during the morning of Sunday, October 19 and another event along the coast south of the Golden Gate and locally in the North Bay Valleys on the morning of October 24.

Sea surface temperatures continued at much above normal levels during the month of October. On October 18, the Monterey Bay buoy was reporting a water temperature of 65 degrees F, which was 8 degrees above normal and the warmest water temperature recorded at this buoy so late in the year.

The combination of two heat events during the first half of October, generally mild weather thereafter, and continued warmer than normal sea surface temperatures along the coast, resulted in October 2014 being the warmest October on record at seven climate stations, and one of the warmest on record at several other locations.

October 2014 was the warmest October on record at the following locations:

Climate Station	October 2014 Average Temp*	Previous record warm October	Length of climate station record
Napa	66.8 degrees F	66.3 in 1959	116 years
King City	66.7	65.6 in 1942	82 years
Saint Helena	66.4	65.8 in 2001	106 years
Berkeley	66.2	65.2 in 1959	116 years
Santa Cruz	65.6	64.3 in 1965	122 years
Monterey	65.1	64.3 in 1992	68 years
Watsonville	65.1	64.1 in 1983	101 years

*Average temperature = (average high temperature + average low temperature)/2

Five more climate stations experienced their second warmest October on record:

Climate Station	October 2014 Average Temp	Record Warm October
Salinas Airport	66.2 degrees F	66.4 in 1983
Kentfield	66.1	66.2 in 1992
Richmond	65.9	66.0 in 1959
Petaluma Airport	65.6	68.5 in 1929
Half Moon Bay	60.4	61.2 in 1983

Finally, the following five climate stations recorded their third warmest October:

- Downtown San Francisco
- Redwood City
- Livermore
- Oakland Museum
- Salinas

October Regional Temperature Summary

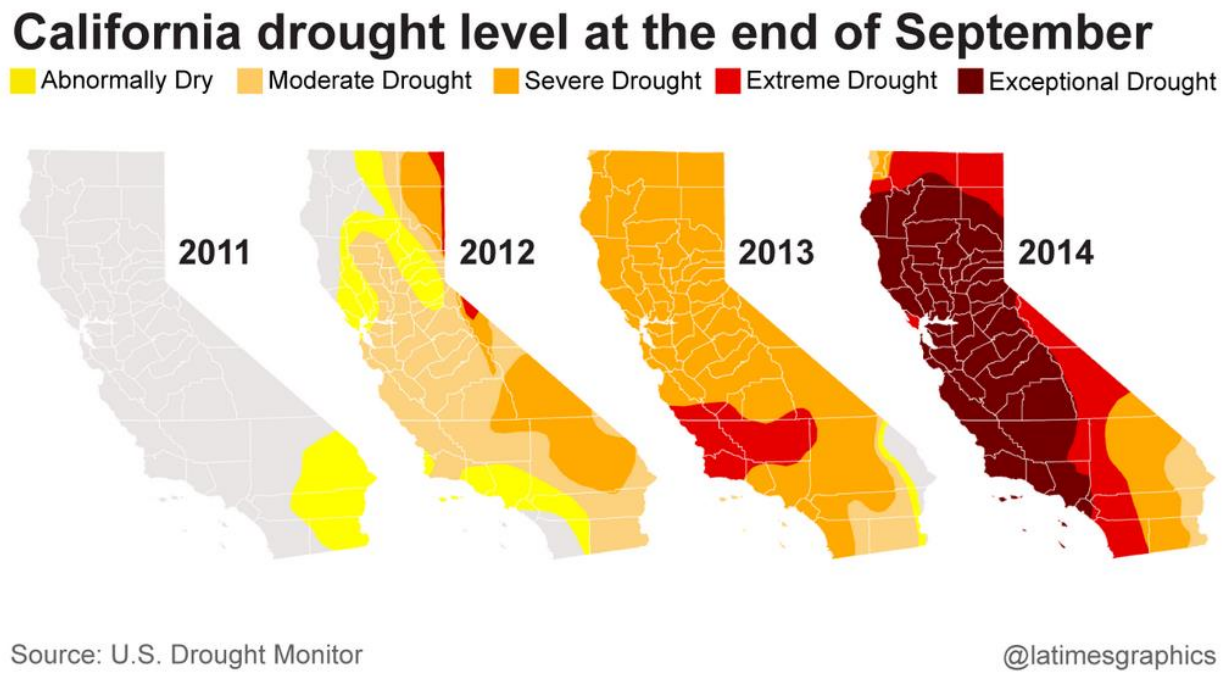
Location	Average High	Normal High	Departure from Normal	Average Low	Normal Low	Departure from Normal
North Bay						
Angwin	75.9	72.6	3.3	52.5	49.7	2.8
Calistoga	81.1	79.3	1.8	54.2	45.4	8.8
Kentfield	79.8	74.1	5.7	52.4	49.6	2.8
Napa	81.9	76.7	5.2	51.6	49.2	2.4
Napa Airport	78.6	74.1	4.5	45.6	43.1	2.5
Occidental	74.6	72.1	2.5	54.8	50.9	3.9
Petaluma Airport	81.4	75.8	5.6	49.8	47.6	2.2
Saint Helena	81.3	77.5	3.8	51.5	48.2	3.3
San Rafael	79.3	72.7	6.6	53.5	51.0	2.5
Sonoma County Airport	80.6	76.4	4.2	48.4	45.0	3.4
Sonoma	80.3	77.4	2.9	49.1	46.8	2.3
San Francisco Peninsula						
Half Moon Bay	69.9	65.6	4.3	50.9	46.9	4.0
Palo Alto	75.9	74.0	1.9	50.4	48.1	2.3
Redwood City	78.7	74.2	4.5	51.9	49.9	2.0
San Francisco Downtown	72.7	69.2	3.5	57.7	53.7	4.0
Woodside	84.6	79.4	5.2	48.0	45.7	2.3
East Bay						
Antioch	80.2	76.8	3.4	55.9	52.4	3.5
Berkeley	77.6	72.5	5.1	54.7	51.5	3.2
Concord	80.9	77.0	3.9	55.7	52.6	3.1
Concord Airport	80.7	76.7	4.0	53.3	51.1	2.2
Fremont	77.7	72.8	4.9	54.4	51.7	2.7
Hayward Airport	76.9	71.5	5.4	55.2	53.6	1.6
Livermore	82.2	76.9	5.3	52.2	50.0	2.2
Livermore Airport	82.6	76.4	6.2	52.8	49.5	3.3
Martinez	79.0	75.9	3.1	43.4	45.8	-2.4
Mount Diablo Junction	75.2	73.5	1.7	57.4	51.6	5.8
Newark	76.9	72.7	4.2	56.3	53.7	2.6
Oakland	77.7	71.7	6.0	56.9	54.4	2.5
Oakland Airport	74.8	69.7	5.1	53.0	51.3	1.7
Richmond	75.2	71.8	3.4	56.6	53.6	3.0

South Bay and Santa Cruz County						
Los Gatos	79.9	74.6	5.3	51.2	48.8	2.4
Moffett Federal Airfield	77.5	73.4	4.1	55.1	53.8	1.3
Mount Hamilton	67.2	64.6	2.6	54.3	51.7	2.6
San Jose	77.7	74.0	3.7	53.6	52.5	1.1
Santa Cruz	78.3	73.2	5.1	52.9	49.5	3.4
Watsonville	77.8	72.2	5.6	52.3	48.4	3.9
Watsonville Airport	79.4	72.3	7.1	53.4	48.3	5.1
Monterey and San Benito Counties						
Carmel Valley	82.8	77.4	5.4	50.1	48.3	1.8
Hollister	82.1	77.0	5.1	50.5	47.4	3.1
King City	84.7	79.8	4.9	48.6	46.0	2.6
Monterey	74.8	68.2	6.6	55.3	50.8	4.5
Monterey Airport	73.1	67.2	5.9	53.6	50.1	3.5
Salinas	78.8	72.7	6.1	51.0	48.3	2.7
Salinas Airport	79.1	72.7	6.4	53.2	49.7	3.5

Daily Temperature Records for October 2013			
Date	**Location**	**Record Max Temp**	**Previous Record and Year**
10/03	San Francisco Airport	95	94 in 1985
10/03	Monterey	96	96 in 1985
10/03	Salinas	99	97 in 1985
10/04	Oakland Museum	92	92 in 1987
10/04	Oakland Airport	92	90 in 1953
10/05	San Rafael	94	92 in 1953
10/05	Moffett Field	88	88 in 1992
10/12	Kentfield	92	91 in 1999
10/12	San Rafael	95	93 in 1978
10/12	Salinas	92	92 in 2004
10/29	Salinas	88	88 in 1993
Date	**Location**	**Record Warm Min Temp**	**Previous Record and Year**
10/03	Downtown San Francisco	65	65 in 1986
10/18	Downtown San Francisco	63	61 in 2012

<u>October Precipitation</u>:

October began with a reminder of the continued exceptional drought conditions across the state of California.



Graphic depicting the progression of the current California drought. These four maps show drought levels as of September 30th during the past four years.

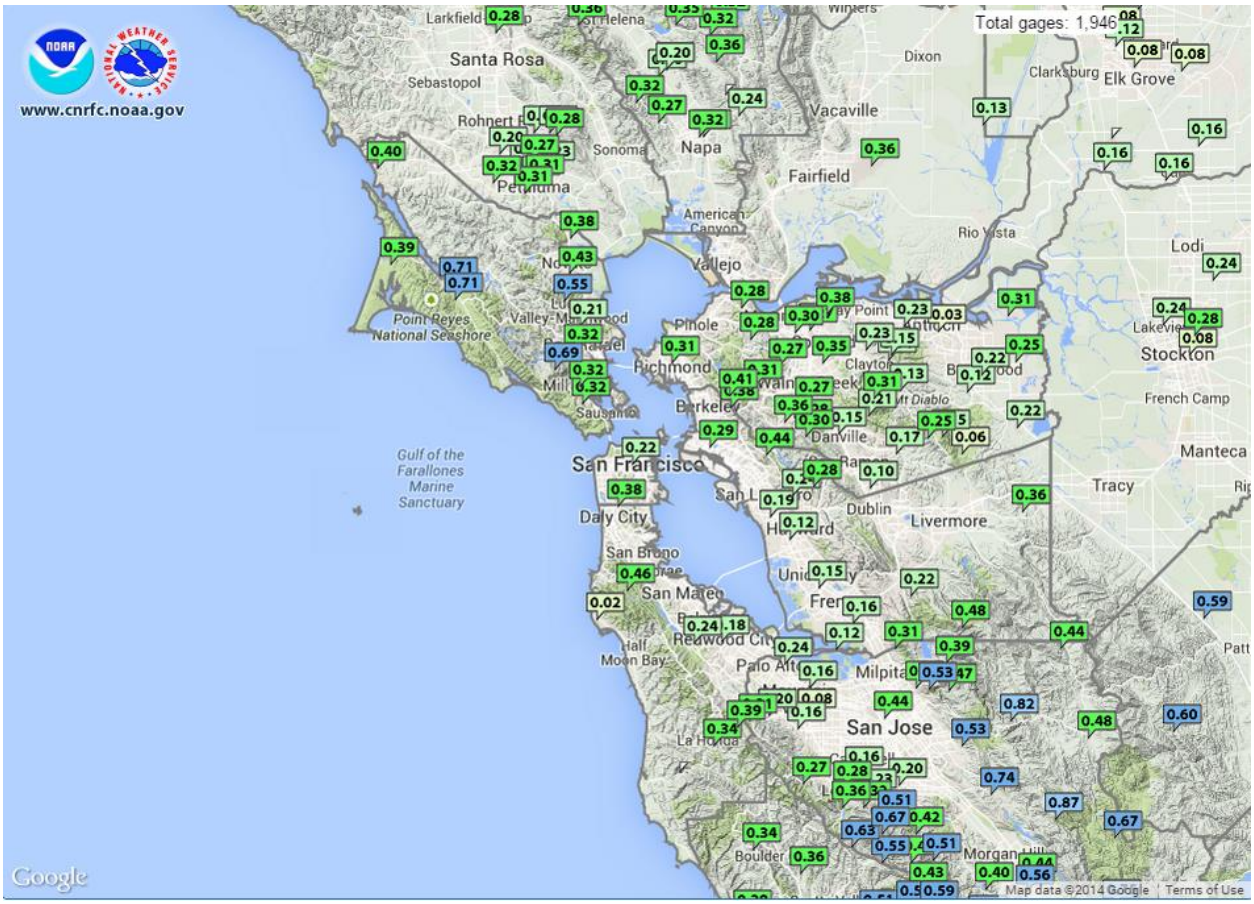
The first half of October was dry. Periodic light rain events began in the middle of the month. The first was October 14-15. Rain amounts were mostly light and generally less than a quarter of an inch. The exception was the North Bay where isolated rainfall totals of between a half inch and an inch were reported. A few days later, on the 17th, more light rain fell, but only in the North Bay.

A weak cold front moved through the area on October 20 and generated less than a tenth of an inch of rain in most locations. Isolated spots in the North Bay picked up as much as a third of an inch.

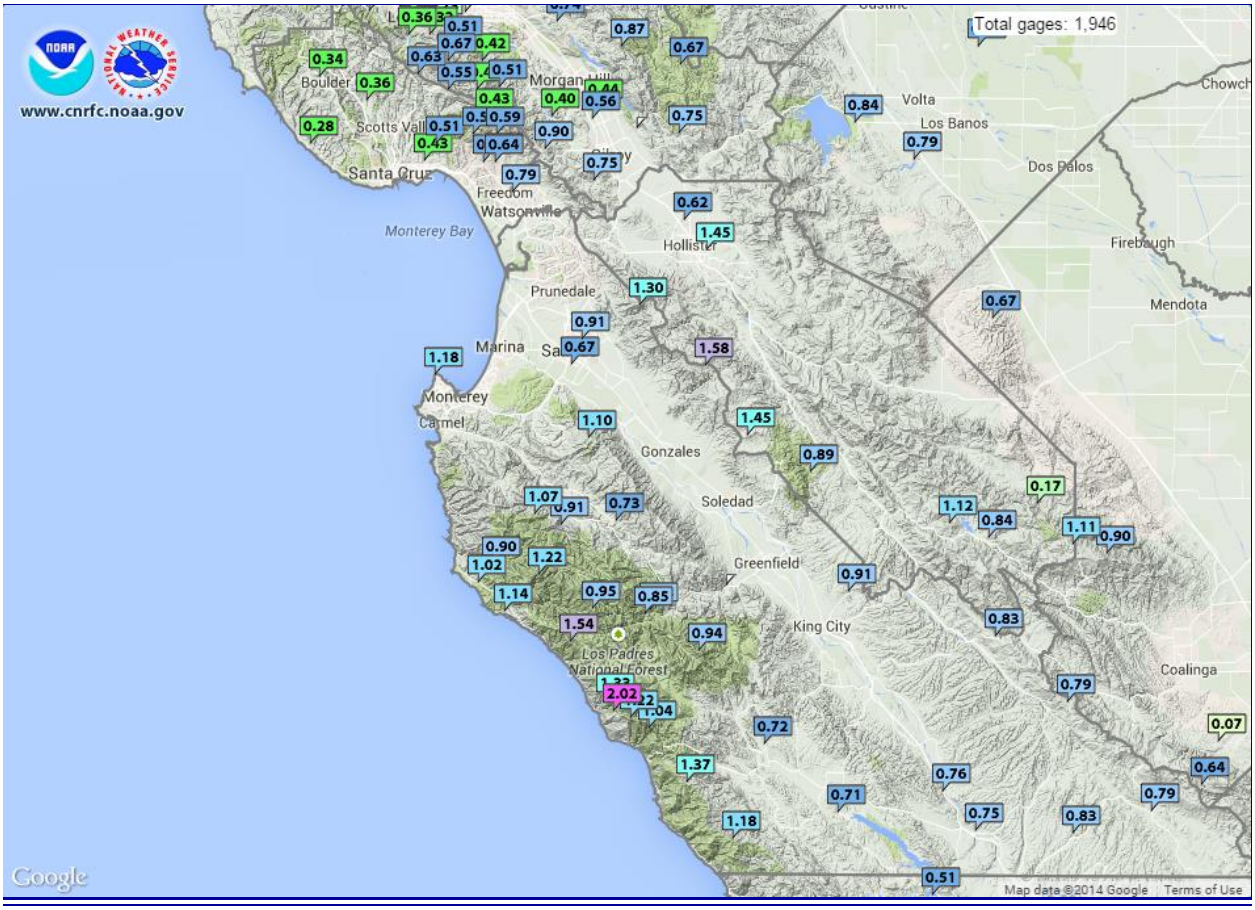
Between the late night hours of Friday, October 24 and the morning of Saturday, October 25, a stronger cold front swept through the area. This system generated between a half and three-quarters of an inch of rain in the coastal mountains. Rain totals were generally less than a quarter of an inch at lower elevations except locally up to a half inch in North Bay coast and valley locations. This system also produced an isolated thunderstorm in northwest Sonoma County early in the afternoon of October 25.

The final rain event of the month began during the late evening hours of Thursday, October 30 when a relatively weak cold front began to spread light rain into the North Bay. Rain pressed south into San Francisco during the morning of October 31. By the time this system reached the

Monterey Bay area during the early afternoon hours on Halloween, it intensified and also slowed considerably. Therefore, rainfall totals from Monterey Bay southward were much higher compared to the San Francisco Bay Area. Rain totals in the San Francisco Bay area on Halloween were generally less than a half inch, except locally higher amounts in the hills of Marin and Santa Clara counties. From Monterey Bay southward there were widespread rain totals of between 1 and 2 inches on Halloween except lower amounts along the northern portion of Monterey Bay and in some of the interior valleys.



Graphic showing Halloween rainfall totals in the San Francisco Bay Area.



Graphic showing Halloween rainfall totals in the Monterey Bay Area and Central Coast.

Because the rain events during the second half of October were mostly light, monthly rain totals were below normal at nearly all climate stations across the San Francisco Bay Area, and in some cases well below normal. October rain totals in the Bay Area were mostly between a third and two-thirds of normal, but were as low as 15-20 percent of normal in portions of the East Bay. The Lick Observatory on Mount Hamilton was the only SF Bay Area climate station that managed to pick up more than their average October rainfall.

The heavier rainfall that occurred across the southern portion of the region on Halloween pushed monthly rainfall totals above normal at climate stations near southern Monterey Bay and in the northern Salinas Valley. The Salinas Airport had the most impressive rainfall statistic for October with a monthly total that was nearly twice the norm.

October Regional Precipitation Summary

Location	October Rainfall	Normal Oct Rain	Percent of Normal
North Bay			
Angwin	1.35	2.19	62
Calistoga	0.98	2.11	46
Kentfield	0.95	2.26	42
Muir Woods	1.01	1.98	51
Napa	0.98	1.48	66
Napa Airport	0.75	0.97	77
Occidental	1.70	2.87	59
Petaluma Airport	0.59	1.43	41
San Rafael	0.72	1.49	48
Sonoma County Airport	0.50	2.03	25
Sonoma	0.51	1.64	31
San Francisco Peninsula			
Half Moon Bay	0.94	1.56	60
Palo Alto	0.12	0.76	16
Redwood City	0.35	1.06	33
San Francisco Airport	0.31	0.95	33
San Francisco Downtown	0.46	1.12	41
Woodside	0.93	1.14	82
East Bay			
Antioch	0.27	0.62	44
Berkeley	0.69	1.37	50
Concord	0.50	0.82	61
Concord Airport	0.44	0.87	51
Fremont	0.45	0.85	53
Hayward Airport	0.35	1.00	35
Livermore	0.17	0.85	20
Livermore Airport	0.19	0.92	21
Martinez	0.20	0.98	20
Mount Diablo Junction	0.56	1.42	39
Newark	0.12	0.81	15
Oakland	0.62	1.37	45
Oakland Airport	0.57	1.20	48
Richmond	0.55	1.44	38
South Bay and Santa Cruz County			
Los Gatos	0.30	1.01	30
Moffett Federal Airfield	0.26	0.64	41
Mount Hamilton	1.52	1.42	107
San Jose	0.62	0.80	78
Santa Cruz	0.84	1.45	58
Watsonville	0.39	1.10	35

Watsonville Airport	1.00	0.92	109
Monterey and San Benito Counties			
Carmel Valley	0.45	0.93	48
King City	0.28	0.63	44
Monterey	1.20	1.06	113
Monterey Airport	1.55	0.93	167
Salinas	0.66	0.64	103
Salinas Airport	1.14	0.58	197

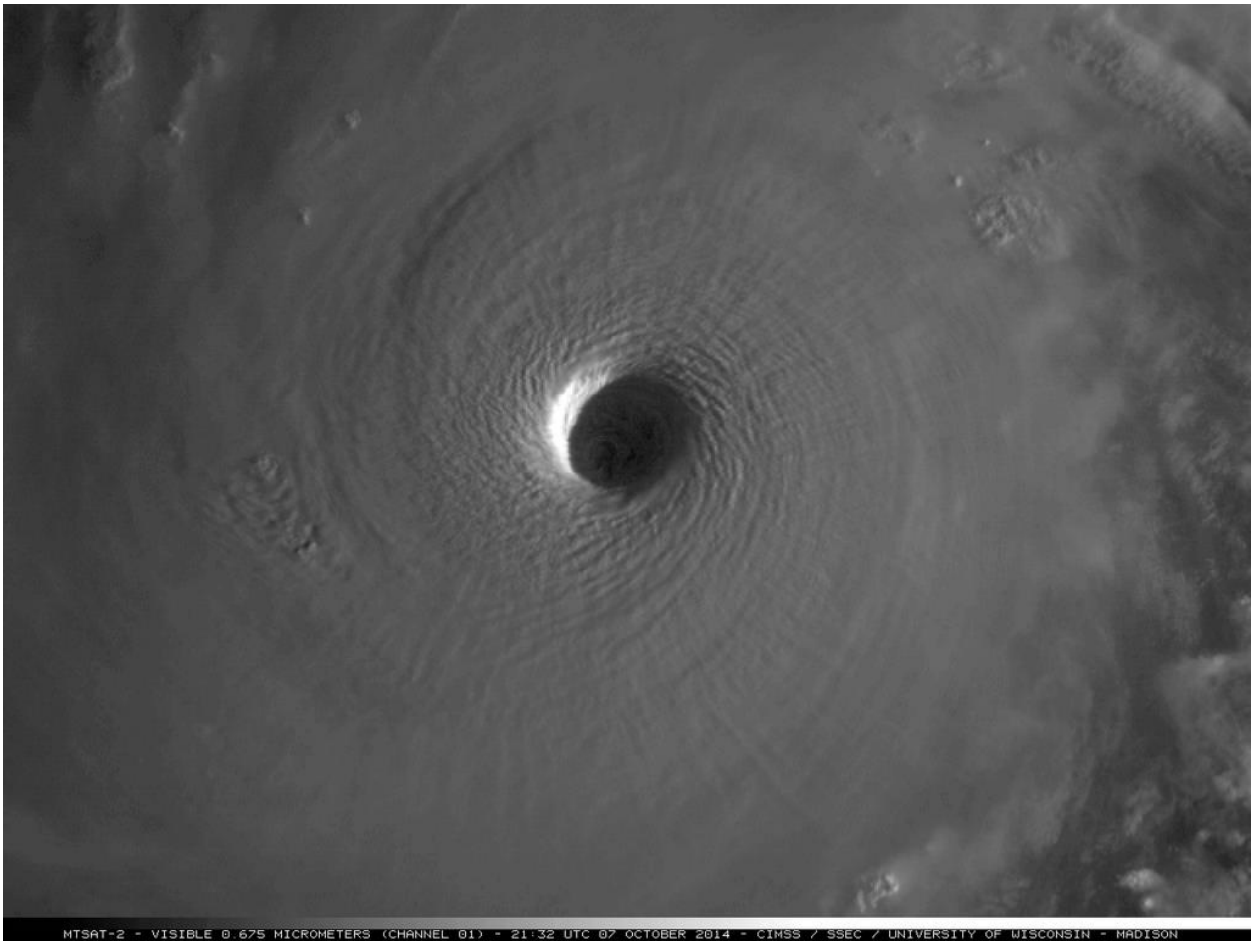
Miscellaneous October Climate Information:

Monthly Ranks for Downtown San Francisco		
Average High Temperature	72.7 degrees	9th warmest out of 140 years
Average Low Temperature	57.7 degrees	2nd warmest out of 140 years
Average Temperature	65.2 degrees	3rd warmest out of 140 years
Precipitation	0.46 inches	67th driest out of 165 years

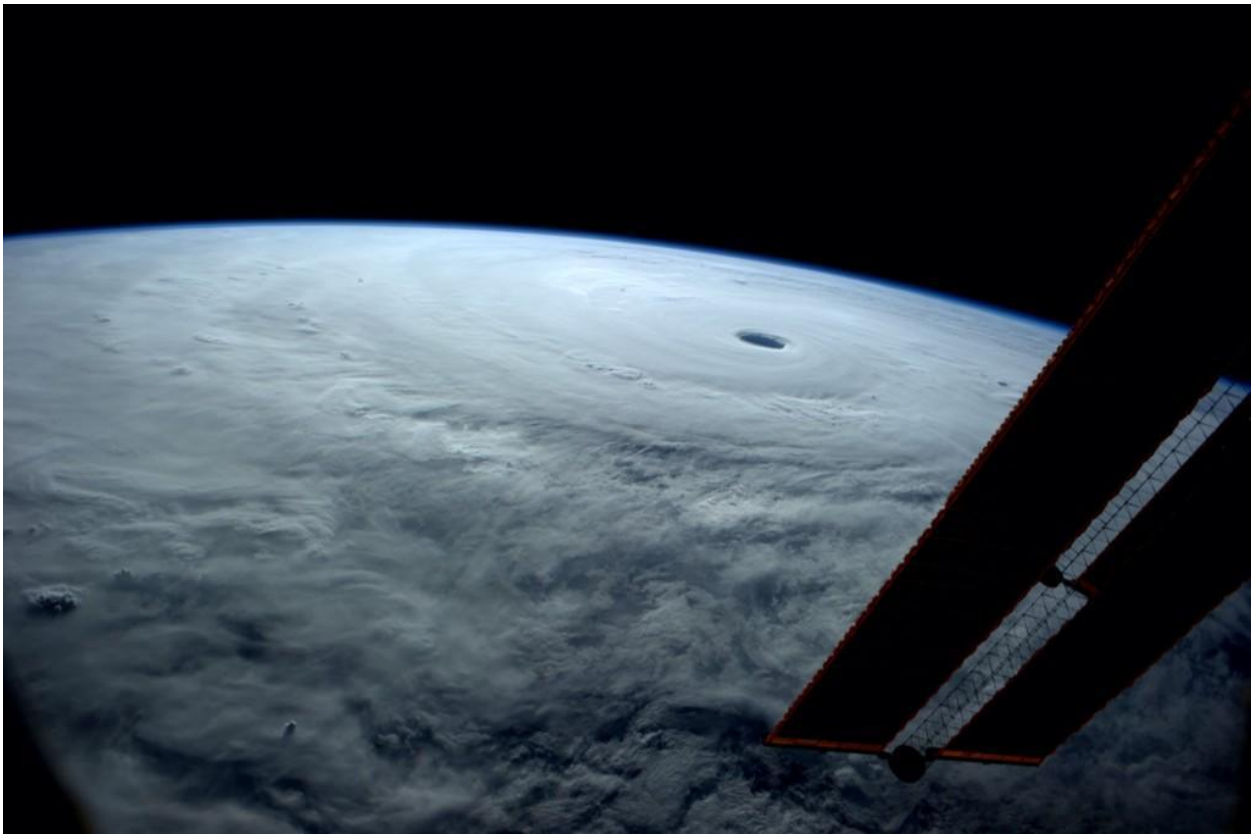
Monthly Extremes for Select Locations			
Location	Max Temp: Warmest Day(s)	Min Temp: Coolest Day(s)	Precipitation: Wettest Day(s)
Napa County Airport	10/12	10/27	10/31
	95 degrees	37 degrees	0.31 inches
San Francisco Downtown	10/03	10/27	10/31
	92 degrees	54 degrees	0.22 inches
Livermore Airport	10/05, 10/06	10/27	10/31
	99 degrees	43 degrees	0.10 inches
San Jose	10/04	10/27	10/31
	92 degrees	46 degrees	0.51 inches
Salinas Airport	10/03	10/27	10/31
	97 degrees	45 degrees	0.95 inches

And Finally…

Included simply for the gee-whiz factor: Images of the western Pacific super typhoon “Vong Fong”



Visible satellite image of super typhoon Vong Fong in the western Pacific, taken on October 7



Another image of super typhooon Vong Fong, this one taken from the International Space Station

Note: Climatological data included in this document is preliminary. For official certified climatological data please contact the National Climatic Data Center at 828-271-4800 or http://www.ncdc.noaa.gov.
Official values as determined at the above web site may take several months for authentication and publication.